

(19) World Intellectual Property Organization
International Bureau



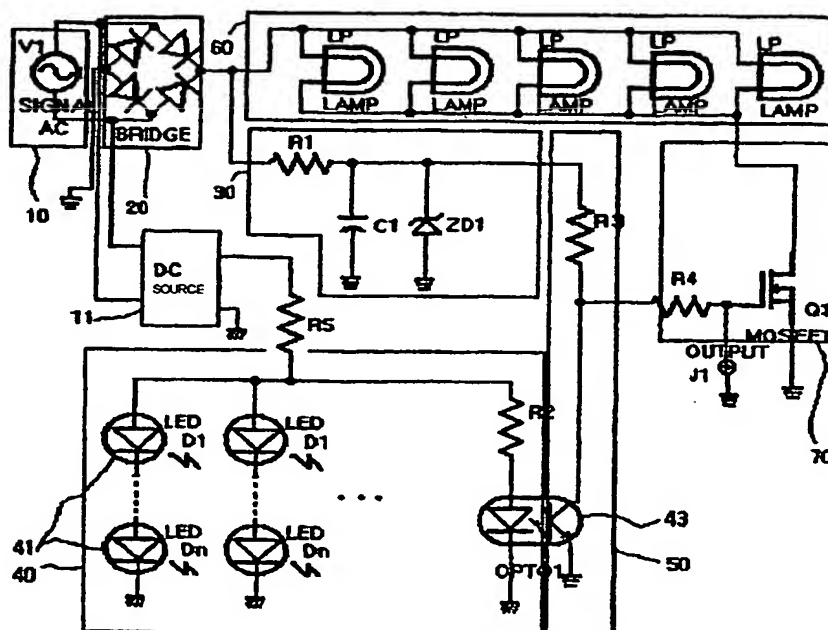
(43) International Publication Date
28 June 2001 (28.06.2001)

PCT

(10) International Publication Number
WO 01/46931 A1

- (51) International Patent Classification⁷: G08G 1/095 (81) Designated States (*national*): CA, CN, JP, US.
- (21) International Application Number: PCT/KR00/01500 (84) Designated States (*regional*): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).
- (22) International Filing Date:
21 December 2000 (21.12.2000)
- (25) Filing Language: Korean
- (26) Publication Language: English
- (30) Priority Data:
1999/29085 U 21 December 1999 (21.12.1999) KR
- (71) Applicant and
(72) Inventor: JANG, Jun-Ho [KR/KR]; 105-1007, Chung-baek Apt., Wolgye-2 dong, Nowon-ku, Seoul 139-913 (KR).
- Published:
— With international search report.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LED TRAFFIC SIGNAL LAMP



(57) Abstract: The present invention discloses an LED traffic signal lamp. Power supplied from an AC power unit is converted into DC power through a full-wave rectifying unit to drive an LED block unit. The LED traffic signal lamp includes a detecting unit, a drive terminal and an emergency lamp unit. The detecting unit detects an error detection signal by detecting an operation of the LED block unit, a drive terminal is driven according to the detection signal detected by the detecting unit, and an emergency lamp unit is driven by the drive terminal.

WO 01/46931 A1

LED TRAFFIC SIGNAL LAMPTECHNICAL FIELD

The present invention relates to a traffic signal lamp,
5 and in particular to an LED traffic signal lamp having a device
for detecting an error and a device for operating an emergency
lamp.

BACKGROUND ART

10 A conventional traffic signal lamp will now be described
with reference to Figures 1 and 2.

Figure 1 is a circuit diagram illustrating a detecting
unit of a conventional traffic signal control unit, and Figure
2 is a flowchart showing an operation of the conventional LED
15 traffic signal lamp.

Referring to Figure 1, when a signal lamp 240 is operated
by an AC control unit 200, current and voltage are induced
through a trans unit 210 according to the operation of an AC
bulb. A detecting unit 220 detects the induced current and
20 voltage, and transmits a signal to a central processing unit
230. In the case of an error state, a yellow lamp is flickered
in the whole traffic signal lamps to warn drivers.

On the other hand, the operation of the traffic signal
lamp using the LED instead of an incandescent lamp will now

be described with reference to Figure 2.

As illustrated in Figure 2, an AC power is transmitted to an LED block unit 330 through a DC power unit 310 and a control unit 320 by an AC power unit 300 for inputting the
5 AC power to the traffic signal lamp 240. The LED block unit 330 may use the LED instead of the incandescent lamp.

Here, 200 to 300 LEDs are connected in series or parallel in the LED block unit 330. Accordingly, when the LEDs are connected in series, if any of them has a defect, the whole
10 LEDs are not operated.

Advantageously, the LED traffic signal lamp consumes small power, namely about 10W in using about 300 LEDs. However, the detecting unit of the conventional traffic signal control unit cannot recognize such small power consumption.

15 In addition, the trans unit is designed suitable for current and voltage flowing through 100W bulb. Therefore, when 10W of the LED traffic signal lamp is installed, the trans unit is reduced to 1/10 induced current and voltage, thus transmitting a non-operation state to the detecting unit.

20 As a result, a new design method is required to detect flow of a small current by using the conventional detecting device. Here, to replace the traffic signal lamp may cause many problems.

DISCLOSURE OF THE INVENTION

Accordingly, an object of the present invention is to provide an LED traffic signal lamp which can detect an error of an LED when the LEDs of a serial LED block are not turned
5 on due to the error, transmit the detected error to another device to handle the error, operate an emergency lamp, and utilize a detecting unit of a general traffic signal control unit according to the operation of the emergency lamp.

In order to achieve the above-described object of the
10 present invention, there is provided an LED traffic signal lamp including: a detecting unit for detecting an error detection signal by detecting an operation of an LED block unit; a drive terminal driven according to the detection signal detected by the detecting unit; and an emergency lamp unit driven by
15 the drive terminal.

According to the present invention, an emergency lamp is automatically operated by error signal detection of the traffic signal lamp itself, thereby preventing a traffic jam from occurring.

20 The traffic jam may also be generated by flickering the whole lamps. According to the present invention, the lamps can be individually flickered to induce a slow speed. Moreover, the device for detecting the error can be externally connected to automatically monitor the traffic signal lamp, which prevents

the traffic jam from occurring.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a circuit diagram illustrating a detecting
5 unit of a conventional traffic signal control unit;

Figure 2 is a flowchart showing an operation of a
conventional LED traffic signal lamp;

Figure 3 is a circuit diagram illustrating a device for
detecting an error and a device for operating an emergency
10 lamp in an LED traffic signal lamp in accordance with the present
invention;

Figure 4 is a full-wave rectification waveform diagram
of the LED traffic signal lamp in accordance with the present
invention; and

15 Figure 5 is a waveform diagram passing a rectifying unit
in the LED traffic signal lamp in accordance with the present
invention.

MODES FOR CARRYING OUT THE PREFERRED EMBODIMENTS

20 An LED traffic signal lamp having a device for detecting
an error and a device for operating an emergency lamp in
accordance with the present invention will now be described
in detail with reference to the accompanying drawings.

Figure 3 is a circuit diagram illustrating the device

fordetectingtheerrorandthedeviceforoperatingtheemergency lamp in the LED traffic signal lamp in accordance with the present invention.

Referring to Figure 3, in order to drive an LED bulb,
5 power is supplied from an AC power unit 10 for supplying power to an AC bulb for a traffic signal lamp 140 to a DC detecting unit 20. As shown in Figure 4, the DC detecting unit 20 detects rectified power. The stabilized DC power for detection forms a low voltage by a Zener diode ZD1 of a rectifying unit 30,
10 and supplies the voltage to an on/off drive of the emergency lamp.

In addition, as illustrated in Figure 3, the AC power unit 10 is connected to a bridge diode composing the detecting unit 20. The bridge diode is connected to a resistor R4 which
15 is an emergency control circuit through the rectifying unit 30 consisting of a resistor R1, a resistor R3 connected to the resistor R1, an accumulator C1 connected between the resistors R1, R2, and the Zener diode ZD1. A high voltage is applied to an emergency lamp unit 60 before the resistor R1
20 of the rectifying unit 30. An LED block unit 40 is driven by connecting the AC power unit 10 to a DC power unit 11 in parallel, thereby driving LEDs in a photo LED 43 connected to the resistor R2.

At this time, a transistor of the photo LED 43 is bypassed

through the resistor R3, and a gate terminal consisting of a transistor Q1 is not driven.

As a result, the transistor Q1 of a drive terminal 70 connected to the resistor R4 of the drive terminal 70 is connected
5 to the emergency lamp unit 60, and thus the emergency lamp is turned off.

In addition, when the LED block unit 40 is connected to the transistor output of the photo LED 43, a detecting unit 50 can confirm the operation of the LED block unit 40 by using
10 the transistor according to the state of the LEDs in the photo LED 43.

When an error occurs, the transistor of the photo LED 43 is not operated. A signal having a reduced voltage through the resistor R3 detects an external output terminal J1 which
15 is an error detection signal through the resistor R4 of the drive terminal 70. Thereafter, the AC emergency lamp unit 60 is operated by driving the gate terminal of the field effect transistor Q1 of the drive terminal 70.

Here, the AC emergency lamp unit 60 is designed so that
20 five 20W AC bulbs can be driven by 100W, which can be recognized by the detecting unit of the general traffic signal control unit. When a detecting code is inversely executed in a program of the control unit, the general device can be used as it is.

In accordance with the present invention, the LED traffic

signal lamp can minimize traffic jams frequently generated in the current traffic system, and also prevent traffic accidents from occurring due to a traffic signal error.

CLAIMS

1. An LED traffic signal lamp driving a LED block
5 unit by power supplied from an AC power unit being converted
into DC power through a full-wave rectifying unit, comprising:

a detecting unit for detecting an error detection signal
by detecting an operation of an LED block unit;

a drive terminal driven according to the detection signal
10 detected by the detecting unit; and

an emergency lamp unit driven by the drive terminal.

2. The LED traffic signal lamp according to claim 1,
wherein the detecting unit comprises a resistor and a transistor
15 connected to the rectifying unit, the drive terminal comprises
a resistor and a transistor connected to the resistor and
transistor of the detecting unit, and the emergency lamp unit
comprises a plurality of lamps connected to the transistor
of the drive terminal and the rectifying unit.

1/3

FIG. 1

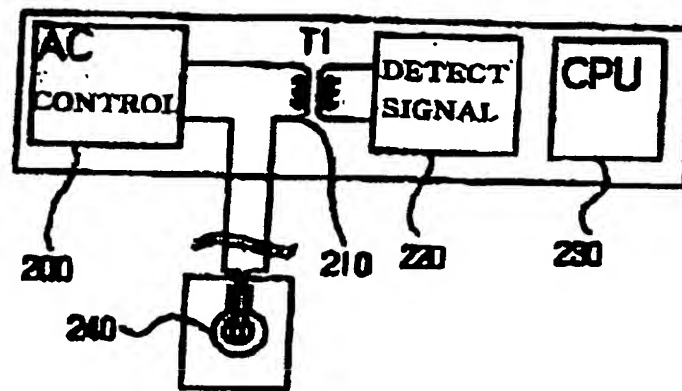
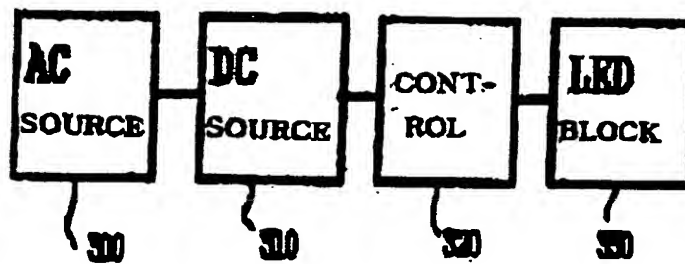
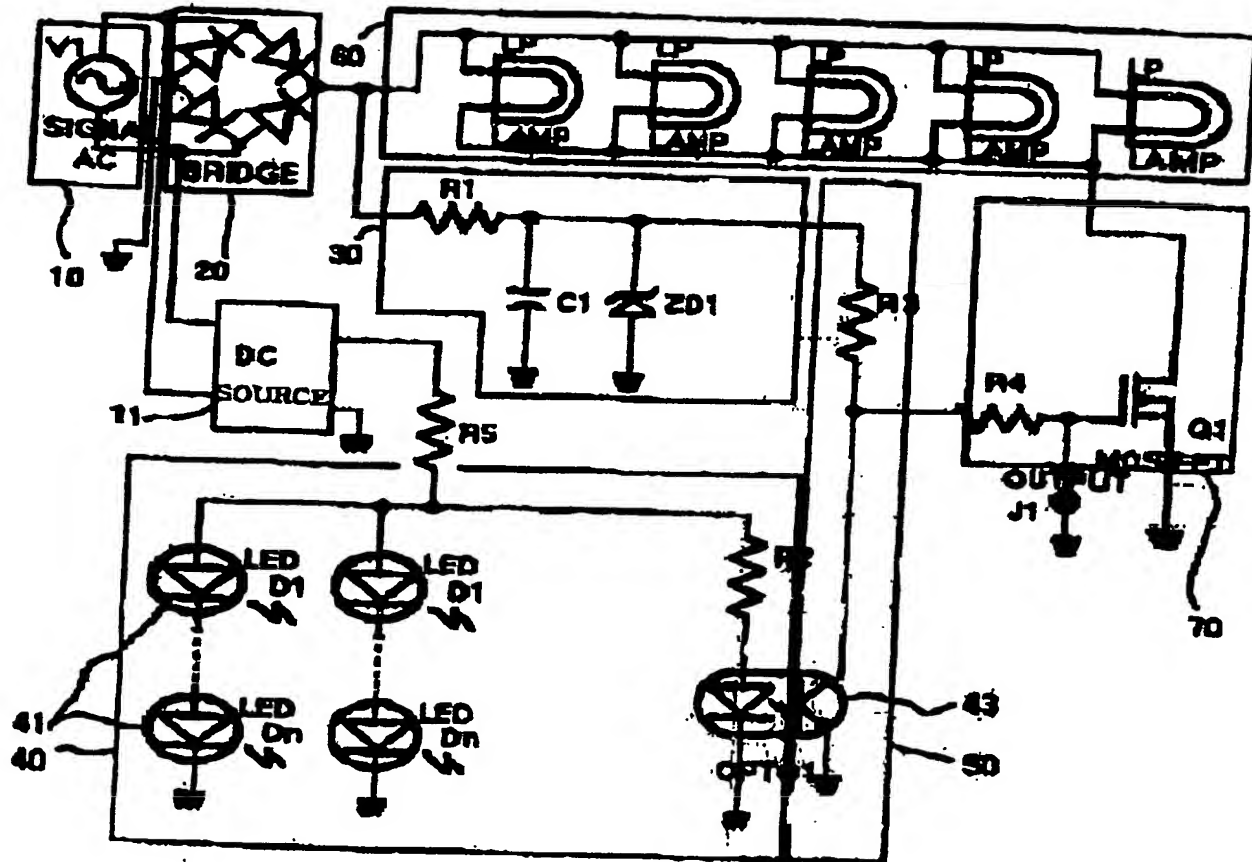


FIG. 2



23

FIG. 3



3/3

FIG. 4



FIG. 5



**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

☐ BLACK BORDERS

☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES

☐ FADED TEXT OR DRAWING

☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING

☐ SKEWED/SLANTED IMAGES

☒ COLOR OR BLACK AND WHITE PHOTOGRAPHS

☐ GRAY SCALE DOCUMENTS

☒ LINES OR MARKS ON ORIGINAL DOCUMENT

☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY

☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.